M.M.: 20 **Time: 30 min**

General Instructions:

(i) There are 14 questions in this paper.

(ii) All questions are compulsory.

1. If $\tan 3x = \sin 45° \cos 45° + \sin 30°$. Find x **[1]**

2. The altitude AD of ΔABC, in which ∠A obtuse and AD = 10 cm, if BD = 10 cm and CD = $10\sqrt{3}$. Find ∠A. **[1]**

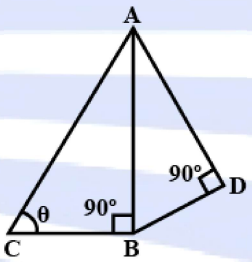
3. If $2\sin A - 1 = 0$, find acute angle A. **[1]**

4. Find the value of A if, $(\text{cosec}\, 2A - 2)(2\cot 3A - 1) = 0$ **[1]**

5. If $\tan\theta = \cot\theta$, then value of $\cos\theta$. **[1]**

6. If $\sec\theta = x + \frac{1}{4x}$, find the value of $\sec\theta + \tan\theta$. **[2]**

7. AD = 3 cm, BD = 4 cm and CB = 12 cm, then the value of $\tan\theta$ equals **[2]**



8. Prove that $\frac{\sin\theta}{1-\cos\theta} = \text{cosec}\,\theta + \cot\theta$. **[2]**

9. Prove that $\frac{\tan\theta + \sin\theta}{\tan\theta - \sin\theta} = \frac{\sec\theta + 1}{\sec\theta - 1}$ **[2]**

10. $2\sec^2\theta - \sec^4\theta - 2\,\text{cosec}^2\theta + \text{cosec}^4\theta = \cot^4\theta - \tan^4\theta$ **[3]**

11. If $\tan^2\theta = 1 - a^2$ prove that $\sec\theta + \tan^3\theta\,\text{cosec}\,\theta = (2 - a^2)^{3/2}$ **[3]**

12. If $\left(\frac{x}{a}\sin\theta - \frac{y}{b}\cos\theta\right) = 1$ and $\frac{x}{a}\cos\theta + \frac{y}{b}\sin\theta = 1$. Prove that $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 2$ **[3]**

13. If $\cot\theta + \tan\theta = m$ and $\sec\theta - \text{cis}\theta = n$. Prove that $(m^2n)^{2/3} - (mn^2)^{2/3} = 1$ **[4]**

14. Prove that $\frac{\cos A - \sin A - 1}{\cos A + \sin A + 1} = \operatorname{cosec} A + \cot A$ **[4]**